IV. Remarks.

The Examiner entered the following rejections.

1. Claims 1, 4, 6, 13, 16, 28, 31 and 43-45 are rejected under 35 USC 102(b) as being anticipated by Winninger et al (US 6,033,331).

As to claims 1, 13, 28, 43 and 45 in the office action the Examiner notes that the abbreviated copy of the ISO standard provided by Applicant in the prior response did not include the referenced characters of standard dimensions designated H, J, K, L and M by Winninger et al, nor did Winninger disclose a date of issue or numbered edition of the ISO standard. Consequently, the Examiner concluded that a written disclosure of "a definitive angle with respect to the disclosure of Winninger et al, other than as depicted, is not realized". Absent this information, in order to support the 102(b) rejection the Examiner appears to rely solely on Winninger Fig. 1 as depicted to teach the limitation directed to "the ribbed profile having a rib with an angle of approximately 90°".

Regarding the sufficiency of prior art references in support of a 102(b) rejection, the court in <u>Amgen, Inc. v. Hoechst Marion Roussel, Inc.</u> 314 F.3d 1313 (Fed.Cir.2003) stated that:

"In patent prosecution the examiner is entitled to reject application claims as anticipated by a prior art patent without conducting an inquiry into whether or not that patent is enabled or whether or not it is the claimed material (as opposed to the unclaimed disclosures) in that patent that are at issue. <u>In re Sasse</u>, 629 F.2d 675, 681, 207 USPQ 107, 111 (C.C.P.A.1980) ("[W]hen the PTO cited a disclosure which expressly anticipated the present invention ... the burden was shifted to the applicant. He had to rebut the presumption of the operability of [the prior art patent] by a preponderance of the evidence." (citation omitted)). The applicant, however, can then overcome that rejection by proving that the relevant disclosures of the prior art patent are not enabled." (emphasis added).

In particular, the court in Sasse observed:

"...the proper test of a description in a publication as a bar to a patent as the clause is used in section 102(b) requires a determination of whether one skilled in the art to which the invention pertains could take the description of the invention in the printed publication and combine it with his own knowledge of the particular art and from this combination be put in possession of the invention on which a patent is sought. Unless this condition prevails, the description in the printed publication is

The ISO standards actually refer to profiles <u>PH</u>, <u>PJ</u>, <u>PK</u>, <u>PL</u> and <u>PM</u> while Winninger specifies profiles "H, J, K, L and M" (3:36), which Applicant is willing to presume refers to the ISO standards for the sake of this argument.

² This alone may be fatal to Winninger as a 102(b) reference since it suggests that Winninger on its face does not enable the claimed rib angle.

³ Applicant notes that Winninger was originally presented as a secondary reference for a 35 USC 103(a) rejection presented in a prior office action mailed 02/23/2007.

inadequate as a statutory bar to patentability under section 102(b)." (emphasis added).

In the instant case the law does not support the Examiner's reliance on Fig. 1 to teach the missing rib angle information. Fig. 1 simply does not teach any rib angle. Fig. 1 cannot be scaled.

As to the written disclosure, the inventor Winninger was careful to specify various particular belt dimensions, including "P" (pitch at 3:34), "L" (belt width at 3:48), "d" (twisted strand width 5:12 and Fig. 1) and "e" (distance between strands 5:12 and Fig. 1)⁵. Given the choice Winninger did not specify any angles in the specification, and instead specifically chose to rely on an extrinsic source to provide other apparently less relevant information such as angles, namely, see US 6,033,331 referring to ISO 9981 at 3:36-37.

Attached to this paper is the full copy of ISO 9981. Table 1 on page 3 discloses the only relevant angle as noted in Applicant's earlier filed arguments, i.e., groove angle 40°.6

"Ordinarily drawings which accompany an application for a patent are merely illustrative of the principles embodied in the alleged invention claimed therein and do not define the precise proportions of elements relied upon to endow the claims with patentability. In re Kinderman, 178 F.2d 937, 37 C.C.P.A., Patents, 800. See also In re Betz, 166 F.2d 831, 35 C.C.P.A., Patents, 1033; Wasberg v. Ditchfield, 155 F.2d 408, 33 C.C.P.A., Patents, 1099. Accordingly, the board in refusing to accept appellant's affidavit and the proposed amendments of his specification properly held:

'The statement as to the particular spatial relationship between the parts included in these claims, which is objected to by the Examiner, is not clearly shown in the drawing and there is nothing in the drawing which definitely supports appellant's contention. It is well known that Patent Office drawings are not normally drawn to scale, with the dimensions and sizes of parts shown to exact measurements as are shop drawings. In the particular case under consideration, the distances and dimensions involved are of the order of a few thousandths of an inch and it appears obvious that the drawing alone cannot be scaled off, under these circumstances, to show that any particular distances or sizes are exactly equal when the specification is completely silent in this respect. For this reason, we do not consider that appellant's drawing supports the position he has taken in respect thereto and we will affirm the Examiner's rejection of these claims as drawn to new matter." (emphasis added).

Olson concerned the propriety of using only the drawings to attempt to establish that ball centering means were equally spaced from the valve seats, given this limitation was not disclosed at all in the original specification. In fact, the drawings were incomplete so that even in the face of material which the court believed was patentable, the Olson court upheld the Board's rejection of all claims for lack of disclosure.

⁴ It is illustrative to touch on the prosecution requirements relating to 35 USC 112. It is well established that absent full, clear and exact disclosure in the specification, the examiner cannot rely on the drawings alone to supply missing information, and in particular incomplete drawings. The court in *In Re Olson*, 41 CCPA 871, 212 F.2d 590 (1954) stated:

⁵ In fact, "P" and "L" relate to the "teeth 23" (ribs). Applicant addressed the meaning of "ribs" and "teeth" in a prior paper.

⁶ Again, this source is at best somewhat ambiguous since ISO 9981 refers to a "groove" angle in Table 1. Applicant is willing to accept that pulley groove angle can equal belt rib angle solely for the purposes of this

As to the relevant date of ISO 9981, page ii states:

"This second edition cancels and replaces the first edition (ISO 9981:1990), which has been technically revised. In particular, a subclause on the tolerances on the diameters over balls (3.3.4) has been added."

Hence, the ISO standard in effect at the time Winninger was filed (Sep. 19, 1997) was ISO 9981:1990. The only change from the 1990 version to the 1998 version was made to section 3.3.4 which does not alter the disclosed angle in Table 1. Hence ISO 9981 only discloses a groove (rib) angle of 40°.

Page 1, section "1 Scope" of ISO 9981 states that:

"The complete array of V-ribbed belts and pulleys of PH, PJ, PK, PL and PM profile for industrial and other non-automotive applications is the subject of ISO 9982. PK belt profile dimensions and tolerances are the same in both International Standards."

As to ISO 9982:1998, the standard in effect in 1997 was ISO 9982:1991. Page ii states:

"This second edition cancels and replaces the first edition (ISO 9982:1991), which has been technically revised. In particular, one subclause on the diameters over balls and another on the manufacturing tolerances for effective lengths of V-ribbed belts have been added."

Hence, the ISO 9982 standard in effect at the time Winninger was filed was ISO 9982;1991. The only changes between the first edition 1991 and second edition 1998 are noted above, which do not include changes to groove (rib) angles.

As so, as to groove (rib) angles for profiles PH, PJ, PK, PL and PM profiles the pulley groove angle is listed as 40°, see Table 1, page 3. Each rib on a ribbed belt engages a pulley groove, and so presumably has a like angle for the sake of this argument, see 1 Scope on page 1, ISO 9982. Both ISO standards specify a groove angle of 40° which Applicant asserts for the purpose of argument may correspond to a belt rib angle of 40°. No other angles are disclosed. The tolerance range for the groove angle in Table 1 for both ISO standards is $\pm 0.5^{\circ}$.

Consequently, at best Winninger enables a groove (rib) angle in the range of 39.5° to 40.5°. Winninger fails to anticipate the noted claims because it does not enable use of the claimed rib angle of approximately 90°.

The remaining claims are dependent. Applicant requests that the application be passed to allowance.

argument. Nonetheless, ISO 9981 does not refer to belt "rib" angles at all, which further casts doubt on the capacity of the ISO standards to enable the claimed rib angle limitation of 90°.

2. Claims 2 and 5, 14, 17 and 29 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon et al (WC 99/43598).

Each of the noted claims are dependent.

3. Claims 3, 15, 18, 21-22 and 30 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon, as applied to claims 2, 14 and 29, and in further view of Suhling (DE 3,934,654) and Siefert (US 3,662,596).

Each of the noted claims are dependent.

4. Claim 19 is rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon et al in view of Suhling and Seifert, as applied to claim 15, and in further view of White, Jr. et al.

The noted claim is dependent.

5. Claim 20 is rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon et al, Suhling and Seifert and White, Jr. et al as applied to claim 19, and in further view of Stork (US 3,948,113).

The noted claim is dependent.

6. Claim 7 is rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon et al, as applied to claim 2 and in further view of White Jr. et al.

The noted claim is dependent.

7. Claims 8-10 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Adifon et al and White Jr et al, as applied to claim 7, and in further view of Stork.

Each of the noted claims are dependent.

8. Claims 11 and 23 are rejected under 35 USC 103(a) as being unpatentable over of Winninger et al in view of Siefert.

Each of the noted claims are dependent.

9. Claims 12 and 24 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al, in view of Suhling.

Each of the noted claims are dependent.

10. Claims 25, 33-34 and 36-37 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Stork.

Each of the noted claims are dependent.

11. Claim 26 is rejected under 35 USC 103(a) as being unpatentable over Winninger et al in view of Suhling and further view of Stork.

The noted claim is dependent.

12. Claims 35 and 38 are rejected under 35 USC 103(a) as being unpatentable over Winninger et al, Suhling and Seifert, as applied to claim 26, and in further view of Stork.

Each of the noted claims are dependent.

13. Claims 1-2, 4-5, 13-14, 16, 17, 28-29, 31 and 43-45 are rejected under 35 USC 103(a) as being unpatentable over Adifon et al (WO 99/43598) in view of McKay (US 2,221,984).

A rejection based on 35 U.S.C. § 103 must rest on a factual basis, with the facts being interpreted without a hindsight reconstruction of the invention from the prior art. Thus, in the context of an analysis under § 103, it is not sufficient merely to identify one reference that teaches several of the limitations of a claim and another that teaches several limitations of a claim to support a rejection based on obviousness. This is because obviousness is not established by combining the basic disclosures of the prior art to produce the claimed invention absent a teaching or suggestion that the combination be made. Interconnect Planning Corp. v. Fiel, 774 F.2d 1132, 1143, 227 U.S.P.Q. (BNA) 543, 551 (Fed.Cir. 1985); In Re Corkhill. 771 F.2d 1496, 1501-02, 226 U.S.P.Q. (BNA) 1005, 1009-10 (Fed.Cir. 1985). The relevant analysis invokes a cornerstone principle of patent law:

That all elements of an invention may have been old (the normal situation), or some old and some new, or all new, is . . . simply irrelevant. Virtually all inventions are combinations and virtually all are combinations of old elements. <u>Environmental Designs v. Union Oil Co. of Cal.</u>, 713 F.2d 693, 698 (Fed.Cir. 1983) (other citations omitted).

A patentable invention . . . may result even if the inventor has, in effect, merely combined features, old in the art, for their known purpose without producing anything beyond the results inherent in their use. American Hoist & Derek Co. v. Sowa & Sons, Inc., 220 U.S.P.Q.

(BNA) 763, 771 (Fed.Cir. 1984) (emphasis in original, other citations omitted).

As the Court of Appeals for the Federal Circuit recently noted, "[w]hen a rejection depends upon a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references." Ecolochem, Inc. v. Southern Calif. Edison, 56 U.S.P.Q. 2d 1065, 1073 (Fed.Cir. 2000). There must be a rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. In re Dembiczak, 175 F.3d 994, 999 (Fed.Cir. 1999). This is because "combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability." Id. Accordingly, to establish a rejection under 35 U.S.C. § 103, a person of ordinary skill in the art must not only have had some motivation to combine the prior art teachings, but also some motivation to combine the prior art teachings, but also some motivation to combine the prior art teachings in the particular manner claimed. See, e.g., In re Kotzab, 217 F.3d 1365, 1371 (Fed.Cir. 2000). In other words, the Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. In re Rouffet, 149 F.3d 1350, 1357 (Fed.Cir. 1998).

The references do not teach all of the claim limitations and hence there is no incentive to combine the references. In particular, as to independent claims 1, 13, 28, 43 and 45 it is easily established that Adifon makes no mention of ribs, instead only teaching *flat* ropes (16), see WO '598 page 4, line 20. The disclosed flat ropes do not comprise nor teach nor reasonably suggest ribs. Ribs are simply not present nor implied. Adifon fails as a primary reference.

McKay does not teach nor reasonably imply the claimed rib angle. Although McKay cites "ribs 12", the specific disclosure cited by the Examiner (Pg. 2, lines 35-49) simply does not specify a rib angle, but instead only refers generally to "pyramidal recesses" or "depressions", at line 41. The term "pyramidal" in no way teaches a rib angle range of approximately 90° since a pyramid may have very "steep" sides, as in an obelisk, or be very "flat" having extremely divergent sides such as with a very wide base and minimal height. As argued for the rejection in rejection no. I above, the figures in McKay cannot be "scaled" to reach the desired rib angle, nor do any of the figures otherwise specify a rib angle. Lastly, and unlike Winninger, McKay does not incorporate any other source to provide any "rib" angle information at all. Consequently, the combination does not enable the limitation

⁷ McKay also fails as a 102(b) reference for the reasons argued in rejection no. 1 above, namely, McKay does not enable the claimed invention because the specification does not disclose a rib angle, and it is not appropriate to scale the McKay figures.

directed to "the ribbed profile having a rib with an angle of approximately 90°".

The remaining claims are dependent. Applicant requests that the application be passed to allowance.

V. Fees

Any fees payable for this response may be deducted from deposit account 07-0475 in the name of The Gates Corporation.

Sincerely

Thank you for your attention to this case.

D. 19-4 10 2003

Jeffrey Thurnau

Attorney for Applicant

Reg. No. 42,183 303-744-4743

INTERNATIONAL STANDARD

1SO 9982

Second addica 1688-08-15

ISO 938Z: (998(E)

Foreword

ISO (the international Organization for

Oraf International Standards adopted by the technical committees are circulated to the member bodies for wing. Publication as an international Standard requires approval by at least 75 % of the member bodies casting a vote.

for industrial applications — PH, PJ, PK, PL

and PM profiles: Dimensions

Belt drives — Pulleys and V-ribbed belts

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International Standard ISO 9992 was grapated by Technical Committee ISOVIC 41, Pullsys and belts (Indiciding vestelts) Subcommittee SC 1, Vectelts and grooved pullsys.

This second exition cancels and replaces the first edition (ISO 5982-1991), which has been bethnically revised. In particular, one subclause on the diameters over bate and another on the menufacturing tolerances for affective lengths of V-ribbed bats have been added.

Annex A of this International Standard is for information only.

B281 OS: 0

Reference number ISO 8932-1988(E)

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ISO 9962:1998(E)

A V-inbed bett drive is composed of an excless bett vith a forgitudinally ribbed bacton surface which sergages and gribs, by inclien, pulley grooves of simfar shape. The bell ribbed surface fits the pulley grooves to make restry total contact.

Introduction

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Figure 1 — Cross-saction of pulley grooves

Albertalian P. day grows bolle.

The utility configuration of the liposette may be anywhere technical mensions and net configurations and selections and selections are selected to the net configuration to a 10° selection of the selection of th

8

Belt drives — Pulleys and V-ribbed belts for industrial

applications — PM, PJ, PK, PL and PM profiles: Dimensions

This international Standard specifies the principal dimenstanal cheracteristics of Vribbed guiley growe profiles, together with the corresponding radiess V-ribbed belts, of PH, PJ, PK, PL and PM profiles which are used for general industrial applications.

The PK bett was originally established for automotive accessory drive applications and 190 9981 deals specifically with tital pericules initi.

2 Normative references

The following standends contain provisions which, through reterence in this text, constitute provisions of this international Standards. At the time of the publication, the editions international Standards are subject to revision, and perfise to expense the standard standard are encouraged to treetigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 254:1898, Botts orthes - Pulleys - Querity, Snish and befance.

ISO 4287:1997, Geometrical product specification (GPS) — Surface leature: Profile method — Terms, definitions and surface hexture perameters.

Pulleys

3.1 Groove dimensions and laferances

The groove dimensions of PH, PJ, PK, PL and PM belts are shown in figures 1 and 2, and given in table 1.

Lennoth diffes COSTOSA (CALSAS HURiga) BO Stanuda + EMGIED Aniese EMCHAN Signistan Panancia, Canigo an aparampini syst

Figure 2 - Pulley diameters

- checking ball or red diamelas ■ damader over teals or note · effective diameter

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Table 1 — Dimensions of pulley grooves

					CIMBRISTON	Unibrished in collection	
Profile		PH	ſď	¥	14	P. P.	
Groove pitch, e i) 2)		1,8 ± 0,03	£0,0± ₩5,2	1,8 ± 0,03 2,34 ± 0,03 3,56 ± 0,06 4,7 ± 0,05	4,7 ± 0,05	9,4 ±0,08	
Groove angle, a3	±0,5°	40.	40°	-07	40.	07:	
l)	mln.	0,15	2'0	0,25	0,4	0,75	
ų,	таж.	6,0	þ ′0	9'0	þ ′0	D,75	
Checking ball or rad diameter, d _B	±0.01	1 .	1,5	2,5	3,5	7	
x2	COUNTY.	0.11	0,23	68'0	2,36	4,53	
2740	max.	0,69	0,81	1,68	3,5	5,62	
f	mis.	1,3	B'1	2,5	3,3	6,4	

3.2 Minimum effective diameter

The minimum recommended effective diameter, dg. for V-ribbed pulleys is given in table 2.

엻 폺 급, 22 Table 2 — Minimum effective diameter 폱 名 2 2 £ Ü 튼 Effective dameter, d_e Profile

3.3 Tolerances on finished pulley

3.3.1 Checking conditions

Prafie, dameter and run-out loterances shall be checked on the faished pulley without surface coading.

3.3.2 Groove-to-groove diameter folerances

The variation is dismethats between the groowes is any one pullby shall be within the fmilis given in lable 3. This variation is obtained by comparing the demeter over balss or rads.

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ISO 8882:4868[E]

ISO 9982:1998(E)

Jabie 3 — Groove-to-groove diameter varietion

Effective diameter, of	Number of grooves, n	Maximum diameter variation
;	0 4.8	0.1
d ₀ ≤ /4	D>6	Add 0,003 for each additional groove
0037	ne 10	91'0
000 to 00 x 41	n > 10	Add 0,005 for each additional groove
100 x 17	01 ≯4	0,25
000 °	n > 10	Add 0,01 for each additional groove

3.3.3 Radial circular run-cut

Radsal choular ron-out shall de within the limits givan in lable 4. Radial nun-out measured with a ball mounted under spring presseure to ansure contact with the gradve as the pulley is rotated.

Tabia 4 — Radiai run-out

Effective diameter, d_{ϕ} Fig. 1) $d_{\phi} < 74$ 0,13 $74 < d_{\phi} < 290$ 0,23 $d_{\phi} > 250$ 0,25 $d_{\phi} > 250$ 0,000 </th <th></th> <th>Dicronaions in maintees</th>		Dicronaions in maintees
	Effective d'ameter, de	yeu a WH
0	d ₄ ≤ 74	0,13
	74 < d, < 250	\$2°0
() Full-Indicator movement.	d ₉ > 250	0,25 + 0,000 4 9et militratre of effective diameter over 250
	() Fullndeato movement.	

GATES CORPORATION

3.3.4 Axial circular rumout

Avial circular run-out (full indicator movement) shall be within 0,002 run per millimetre of etitocine diameter. Run-out is measured with a ball mounted under spring pressure to ensure contact with the groove as the pulley is rotated.

3.3.5 Dlameter over balls

The tolerances on the desirator over balls (K) shall be within the finite given in table 5.

N's rut metat in the nominal domains of the pruly, but is pregumed from the extra rise proteins of ball or rad in the guiley.

2) The sum of all devisions from the nombel value effer all growns in any puttry shall not access ± 0.3.

The talerance on d applies to the distance between the exest of two consecutive grooves. The constraints of the groove shall make an engle of $90^\circ\pm0.5^\circ$ with the axis of the pullby.

ISO 9882:1998(E)

Dirensions to militarities Tolerance ±0,6 +0.1 ±0,3 Tabla 5 — Telerance on the diameter over balls For each additional 25 mm, add Diameter over balls, K 75 < K ≤ 200 K < 75

3.3.6 Groove finish

The pulley gradies shall have a surface roughness $R_{\rm s} \leqslant 3.2 \, \mu m$. See ISO 254 and ISO 4287 for definitions and the method of reseaurement.

3.4 Pitch diameter, d_e

The fit of a V-Robed ball in the corresponding pulley is shown in figure 3. The first pitch dismater of a V-Robed pulley is slightly larger than the effective diameter and its exact value is determined with the perfection rest being used.

The appropriate norwal value of the effective line differential b., which is:

0,8 mm for the PH profile,

1,2 mm for the PJ profile.

2 mm for the PK profits,

3 mm for the PL profile, and

4 mm for the PM profile;

may be used to calculate the speed raffo. If more precision is required, the belt manufacturer should be conculbed.

Further Information is given in ISO 9370.

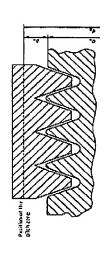


Figure 3 — Deformination of pitch diameter teams on several from periodic view in (1942) of the control of the

ISO 9982:1998(E)

3.5 Designation of pulleys

A V-rithed pulley is characterized by the number of gnowes, the profile and the effective demeter. It is designated by a series of numbers and bitters as follows:

a) the first letter 'P' maans 'Pulley',

b) the first set of numbers indicates the number of grooves;

c) the second set of letters indicates the groove profile;

the second set of numbers indicates the effective diameter, in millimetres.

EXAMPLE

Beits

4.1 Belt dimensions

The belt dimensions are shown on figure 4, and given in table 6.

OSIG



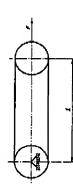
Measurement of effective beit length 4.2

4.2.1 Measuring focure (see figure 5)

The effective bett langth shall be determined by placing the bell on a measuring fixture composed of the following elements.

4.2.1.1 Two pulleys of equal diameter, one of which is fixed and bits other movable.

Their profile shall comply with figure 1 and table 1, and their recommended effective dismeter shall be determined from the valves given in table 7.



Ryune 8 - Massuring Extern to deferrance sifestive hage

Table 7 — Measuring pulleys and measuring forces

Profile	Hd Nd Nd Hd	H	•	5	¥4.	1	2
Pulley effective circumference (at the level of effective diameter), $U_{m e}$	Ş	8	ĝ	300	8	易	B
Diameter over balls or rods, K ±0,13	±0,13 31,84	9'58	32.08	86,72 95,48 181,91 238,17	B+*%	184,91	218,17
Measuring force par rib, F	8	•	ຶ	8	ğ	뎙	55

4.2.1.2 Device for applying a total measuring face to the movable pulley.

4.2.1.3 Davice for measuring the centre distance between the two pulleys.

4.2.2 Reasuring force

The measuing faxe to be applied for measuring the effective length of telts Is given in table 7.

4.2.3 Proceedure

To measure the affoctive length of a balt, rotate the telf at least two revolutions to seal it properly and to divide the boot force equally between the two stands of the balt.

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ISO 9982:1998(E)

Alterative Secretary

Alternative Bell graveabilize

Figure 4 — Gross-section of belt

Table 6 — Belt dimensions

Profile		Hd	2	¥	<u>۲</u>	£
Rib pilch, 0,		B'1	2,34	3,58	4.7	9,4
r _b	min.	€'0	6,0	0,5	6 ,4	0,75
ر	max	0,15	70	0,25	Đ,	0,75
Belt height, h	1	3	+	Ð	10	17
NOTE — Belt no pub and belt haight are shown as retrience directations only. Cumbine the public better the second respondent veing frequently affected the second respondent veing the property affected	pitch and in tolerance	bolt hoight is an (mpo	are store	t os refere Posever, i	nce direct 's frequeri	ions only. It affected

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Den measure the carrie distance between the pulleys, $\vec{\mathbf{c}}_i$ and calculate the effective length, $\mathbf{L}_{m{\omega}}$ of the belt using the following townsia:

1. = Emas + Enin + U.

where

is the effective circumference of the measuring pulleys; ຈ"

 \mathcal{E}_{nec} is the maximum centre distance between the pulleys;

 \mathcal{E}_{n_0} is the minimum centre distance between the pulleys.

4.2.4 Manufacturing tolerances

The permissible manufacturing bilerances for effective lengths of V-ribbad belts are given in table 8.

The bobrances (or both 8 are approximately calculated using the equations given below. The values for I, in the equation are the maximum for the rings and the results are rounded to reasonable values.

+0,3 3/L, +0,0001,

-2 × (0,3 3/1, +0,003.1,)

Table 8 -- Manufacturing tolerances for effective lengths of Y-ribbad belts

Ē				Γ
oos in millime		P.		
Omershus and learances is milimeter	llon	굽		
Omers	Permisalbis daviation for profiles	×	+ 4	9 1
	Perm	2	• 4	4
		몺	8~ **	y .
	Effective langth	الم	200 < L, < 500	
•	•			

Permisable davlation for profites	PK PL PW	4 4 1	+ 5	+ 8 + 8 -12 -12	+ 8 + 8 - 16 - 18	+ 10 + 10 - 20 - 20	+12 +12 +12 -24 -24	+15 +15 -30	+20 +20 -40 -40	+30 +30	+ 45	+ 60 - 120
Perm	2	• • • •	+ 2 - td	+ 6	+ 8 - 16	+ 10	+12				,	
	폱	+ 4 - 8	+ 5 -10	+ B - 12	8 + - 15	+ 10 - 20	+ 12 -24					
Effective langih	۲,	005 > ^a T > 00Z	051 > "1 > 00\$	750 < 6, < 1000	005 (> °T > 000 (1 500 < L, < 2 000	000 E > *7 > 000 Z	000 + > €7 > 000 €	4 000 s 2" = 6 000 4	000 9 > "7 > 000 9	. 8 000 < €, < 12 500	12 500 < 4, < 17 DCO

Dan win Offes Corporation (25) First State (2) OS State Salt (2) O

ISO 9982: F998(E)

4.3 Designation of befts

A V-fibbed bett is characterized by the rumber of bell fibs, the profise and the effective bength. It is designated by a sories of numbers and letters as follows:

a) the first set of numbers indicates the number of belt itts;

b) the letters indicate the balk profile;

c) The second set of numbers indicates the effective langith, in millimatres.

EXMIPLE

Haram of tell ribs — Sat partis

LOUNE IN CHES LONDONATORISET THINNEYS 180 Soon coles arthritomic speziellon (St.) Pago uni Posterbjer og an endering materia

15O 9882:1898(E)

ISO 9982:1998(E)

[1] ISO 8370-2:1993, Birll othres — Dynamic lest to deliamine pitch zone location — Part 2: V-ribbed belis. Annex A (informative) Bibliography

[2] ISO 9991:1998, But drives — Pulleys and V-ribbed belts for the sutunothe incusty \cdots PK profit: Dimensions.

ICS 21.220,10

Descriptors boldman, pulsas, godone pulsas, pose-icasualini 60 554830 Price lassed on 14 pages

INTERNATIONAL STANDARD

ISO 9981

ISO 9981:1998(E)

Foreword

Second edition 1938-11-01

the sight to be represented on that committee, themselved organizations, governmental and non-governmental, in Jaison with ISO, also take part in the work. ISO collaborates closely with the telematicnal Electrotechalical Commission (IEO) on all menters of electrotechalical standardization. ISO (the International Organization for Shanderdization) is a

Orafi international Standards adopted by the bestinited committees are circulated to the member bodies for voting. Publication as an international Standard requires approval by at least 75 % of the member bodies pasting a vote.

International Standard ISO 9981 was prepared by Technical Committee ISO/TC 41, Purbys and boths (Including veebalts) Subcommittee 9C1, Veebelts and grooned pulkys.

Belt drives - Pulleys and V-ribbed belts for

the automotive industry — PK profile:

Dimensions

Transmitstons per counciles — Poulies et courroles strides pour le construction actemble — Profit FFC Chaussions

This ascend edition cancels and replaces the first edition (ISO 8681:1890), which has been technically revised. In perfoculer, a subcleasure on the tohermost on the diameters over balls (3.3.4) has been tabled.

Annex A of this Informational Standard is for Information only

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Raferance number IGO 9988:1598(E)

ISO 9881:1998(E)

A Valibbed belt drive a composed of an enclass belt with a knegbullically dibed traction surface which ongages and cyle, by fliction, pully growes of similar shape. The best fibbed surface the pullay growes to make nearly intol exchact.

introduction

•130

INTERNATIONAL STANDARD 6150

ISO 8981:1398(E)

ISO 9981:1998(E)

Beft drives — Pulleys and V-ribbed betts for the automotive Industry — PK profile: Dimensions

1 Scope

This international Standard especifies the principal dimensional characturistics of V-nisbed pulley grows profiles, together with the consessourding endless V-richard belts of FK profile which are used predominantly for enternotive eccessory drive applications.

The complete stray of V-fibbed beds and pullays of PH, PJ, PK, FL and PH profile for inductial and other non-zutonables epticators is the subject of ISO 9982. PK balt profile ofmensions and torestones are the earne in both Infernational Standards.

2 Normativo references

The following standards contain provisions which, through reference in this last, constitute provisions of this international Standard. At the time of the publication, the existing indicated were verify. All standards are subject to revision, and perfose the greenments based on the full manufard. Standard are encouraged to investigate the possibility of stocking the most recent editions of the standards to below, Members of IEC and ISO mathiate registers of currently valid international Standards.

180 254:1938, Bell chins — Pullays — Quality, finish and balance.

180 4287:1997, Goometrical product specification (GPS) — Surface texture: Profile method — Terms, definitions

3 Pulleys

3.1 Groove dimensions and tolerances

The grows dimensions of PK pullays are shown in figures 1 and 2, and given in table 1.

Figure 1 — Gross-eaction of pullay grooves Alberrathre-Pulley strong bolf 20 The actual configuration of the 16 profilement to emphase a between the most run and efficient independing the following independing the section of efficient corresponding the 10 minutes are tengent to the grown situated. The configuration of the parties of the configuration of the configurati

effective dismeter

= outer digmeter

= checking ball or rud dlameter - diameter over balls crinds

Figure 2 - Pulley dumsters

PAGE 28/32 * RCVD AT 10/19/2007 12:01:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/4 * DNIS:2738300 * CSID:3037444653 * DURATION (mm-ss):04-40

o ISO

09:51

fabbe 1 — Dimensions of PK pulling grooves

	Oknarsk	Otnerskye is milimetres
Groove pitch, e	±0,05 (1/2)	3,55
Groove angle, and, for measuring	±0.15	40.
Groovs angle, 43, for feeting and actual use	± 1*	40*
· ·	mln.	5270
7 ₆	mate	979
Checking ball or rod diameter, 4,	±0.01	2.5
2.	nom.	86'0
2849	oneu.	1,68
7	rutn.	2,6
enroding exhibitions on to case of neared sometibe of a soligies, no contribution (f	xes of two consecutive	фотов.
2) The cam of all deviolations from the examinal value ϵ for all grooves in any one pulley shall not examed ϵ 0,3.	ell grooves in any one	puley shall not
رجئم وال له ضنه درا ثلاث، 20,9 £ 90% مخوص مد مخدم الدنة مسمعي منا 14.	total with the coin of th	to prode
4) If is not related to the nominal damples of the pulley that is measured from the actival ride position of the bell or red in the scaley.	b√ é measured fom	the actual ride

3.2 Kinimum effective diameter

The minimum recommended effective diameter, of, for PK pullage is 45 mm.

3.3 Tolerances on finished pullay

3.3.1 Checking conditions

Profile, dismelve and run-out baleanness shall be checked on the divisited pullay without surface coefing.

3.3.2 Groovedto-groove damater folgrances

The variation in demetins between the growes in any one pullity shall not exceed 0,15 mm. This variation is obtained by comparing the demetine over helts or note.

3.3.3 Radial and artial chruiter nur-out

Radial and asset obtains ruit-outs strait not exceed 0,25 mm full indicator movement (FIAI). Ruin-out in the bio Observable increasinal separately with a ball mounted under spring prossure to ensure contact with the groove as the pullay is noticed.

2.3.4 Diamoter over balls

The loberances on the damaters over bulk (A) shall not exceed \pm 0,6 mm.

3.3.5 Grown finish

The pulley grows shall have a surface muchiness Ro < 3.2 µm. See ISO 254 and ISO 4257 for definitions and the markod of insuscientaria.

ISO 9961:1998(E)

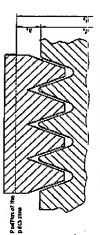
ISO BB81:1998(E)

3.4 Pilch diameter, d.

The fit of a V-ribbed belt in the corresponding pulley is shown in figure 3. The true pAch dismeter of a V-ribbed pulbey is stightly berger than the adjective dismeter and its exact wake is determined with the particular belt gused.

A nearbal value of the effective line differential, 6, of 2 rmn may be used to calculate the speed ratio. If more precision is required, the belt manufacture should be consuited,

Further information is given in 13O 8370.



Agure 3 — Determination of pitch dlamater

3.5 Designation of pulleys

A V-ribbed pullsy for the eutomotive inclusiby is characterized by the number of grooves, the profile and the effective dismeths. If it designed by a series of rumbers end latters as follows:

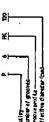
a) the first letter 'P' means Pulley';

b) the first set of numbers indicates the number of grooves;

c) The second set of heters indicates the groove profile;

d) The second set of numbers indicates the effective clameber, in millimetres.

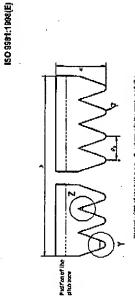
EXAMPLE

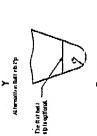


Belts

4.1 Belt dimensions

The cimmistans of the PK betts ere shown on figure 4 and gives in table 2.





AUStreams self grove bolton The configuration of the battering groups before it is involved between the institute of the order in batteried

Figure 4 — Cross-section of beth

Table 2 — PK belt dimensions

	Comension	Omensions in milmetres
RIB plich, Po		85'8
7 ₆	mh.	č(0
r	max.	57'0
Befi height, &	1	4 to 6
KOTE — RD olth and bet height are shown as reference dimensions only. Curulative for pick laterated as infinitely and its brocketill effected by the bracket in a width this but considers and the modeling of the laterary marrier.	e dimensions o	nly. Cumulative sneeting of which

ISO 9981:1998(E)

4.2 Measurement of the effective beit langth (2.1 Heasuring facture (see figure 5)

The effective belt length shall be determined by placing the belt on a measuring facture compassed of the following

4.2.1.1 Two pullays of aquel dismeter, one of which is fixed and the other moveble.

Their profile strail comply with Sigure 1 and table 1, and their recommended effective diameter shall be determined from the values given in bable 1.

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42.1.3 Device for measuring the centre distance between the two pureys. 4.2.1.2 Device for applying a total massuring force to the movetie pulley.

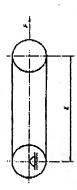


Figure 6 — Measuring fixture to determine effective length

422 Heasuring larce

The measuring face to be applied for measuring the effective largeh of beits is given in table 3.

Table 3 — Measuring pulley and measuring force

Pulley effective circumbrance (at level of effective diameter), U.	300
Diameter aver balls or rode, X ± 0,13	96,48
Massuring force per rib, F	100

423 Precodure

To measure the effective length of a ball, redsia the bett at least two revolutors to scat it propurly and to divide the Vital force equally between the two obsends of the bett.

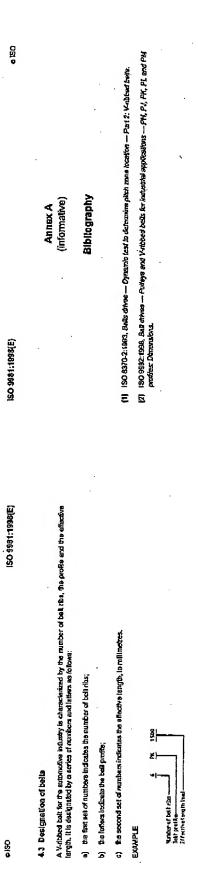
Then measure the centre distance between the pulleys, k_i and calculate the effective largith k_q , of the belt value to belowing formula:

where

U. Is the effective circumference of the moreoving pulleys;

Form is the maximum centre detented between the pulleys:

E_{nter} is the minimum centre distance between the puteys.



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ISO 9981:1998(E)

Descriptors: next values, betmut contration employ, bell oftens, publics, graved publys, belts, power temuration belts. Youth, dissentation, designation.
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